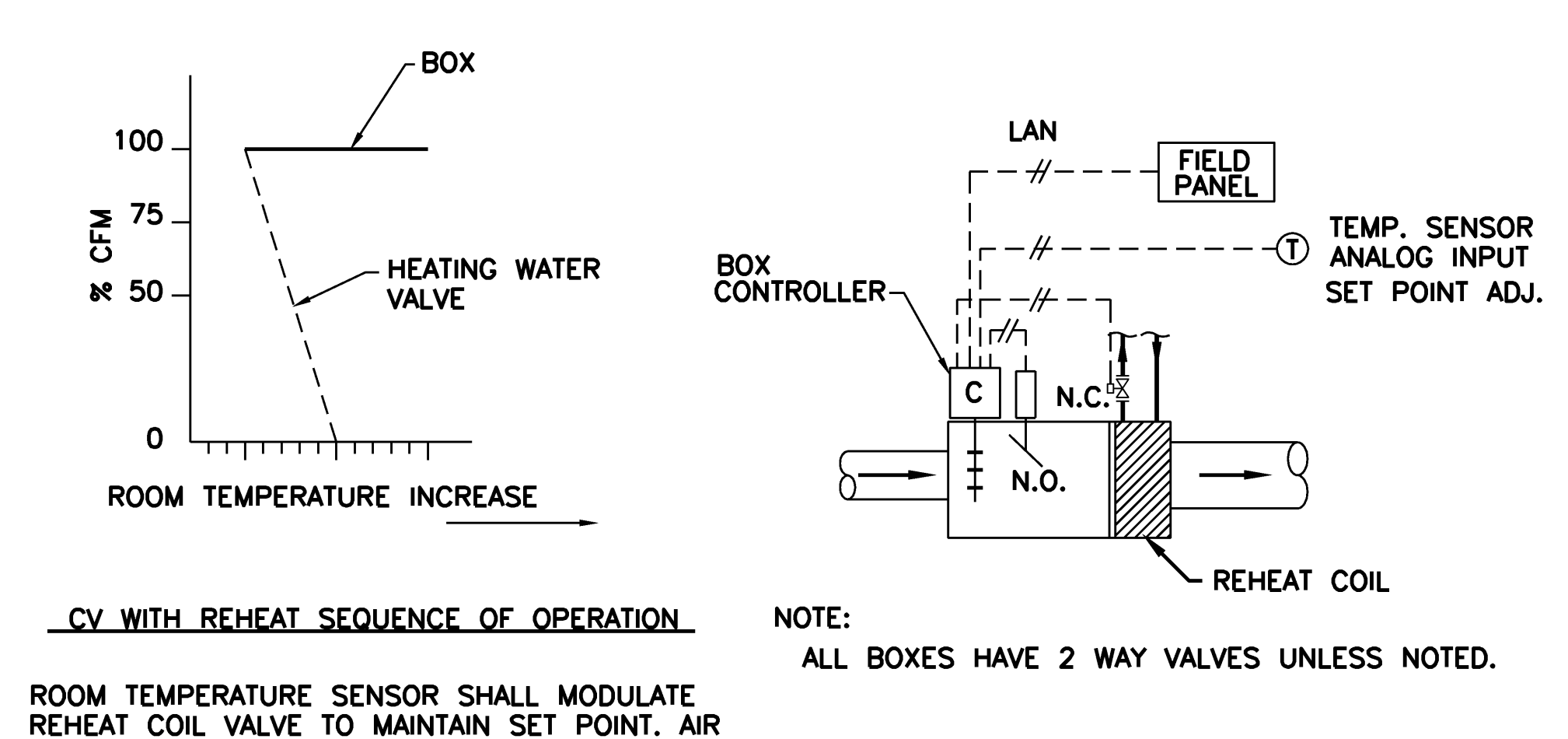
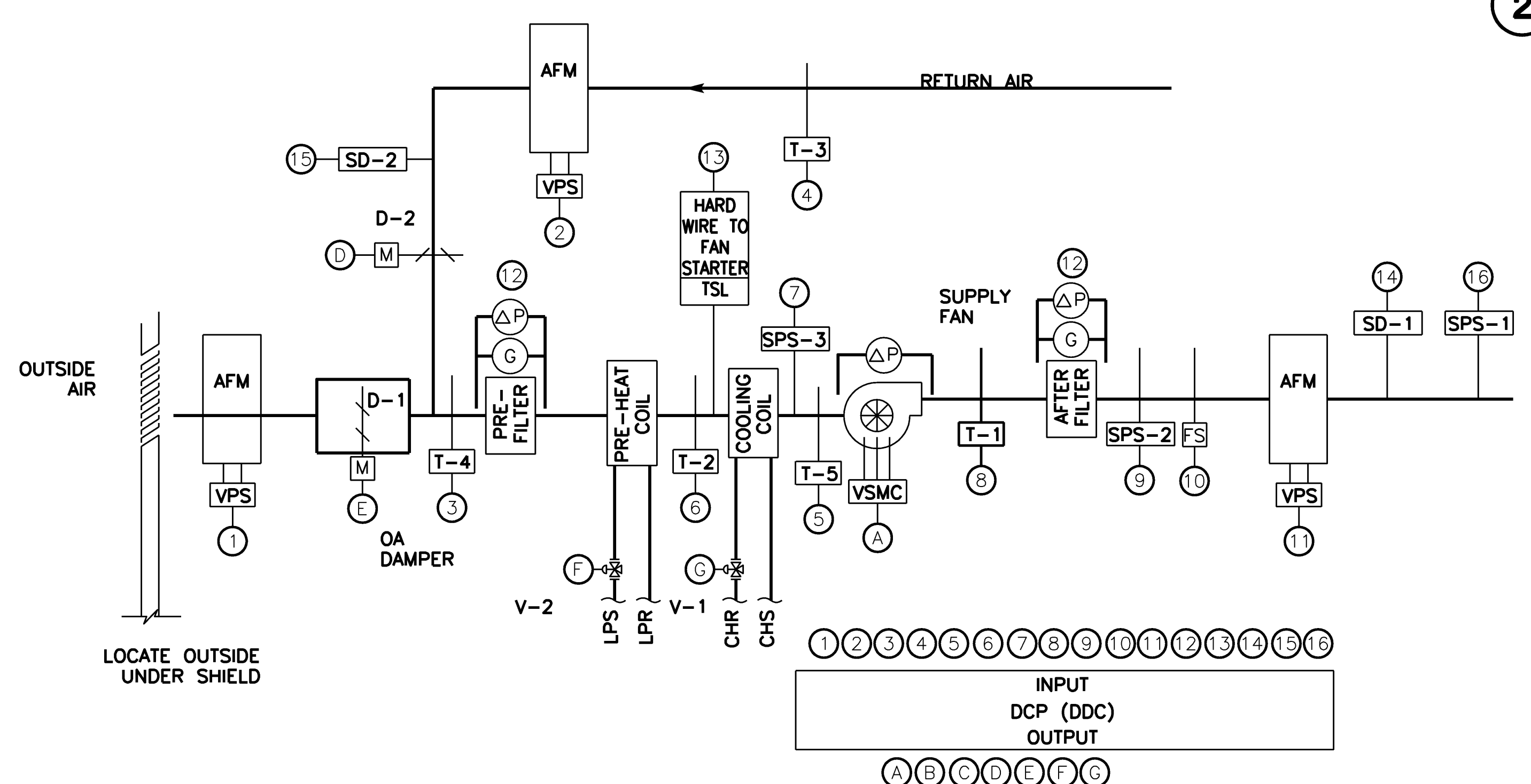


three inches = one foot
one and one half inches = one foot
one inch = one foot
three quarters inch = one foot
one half inch = one foot
three eighths inch = one foot
one quarter inch = one foot
one eighth inch = one foot



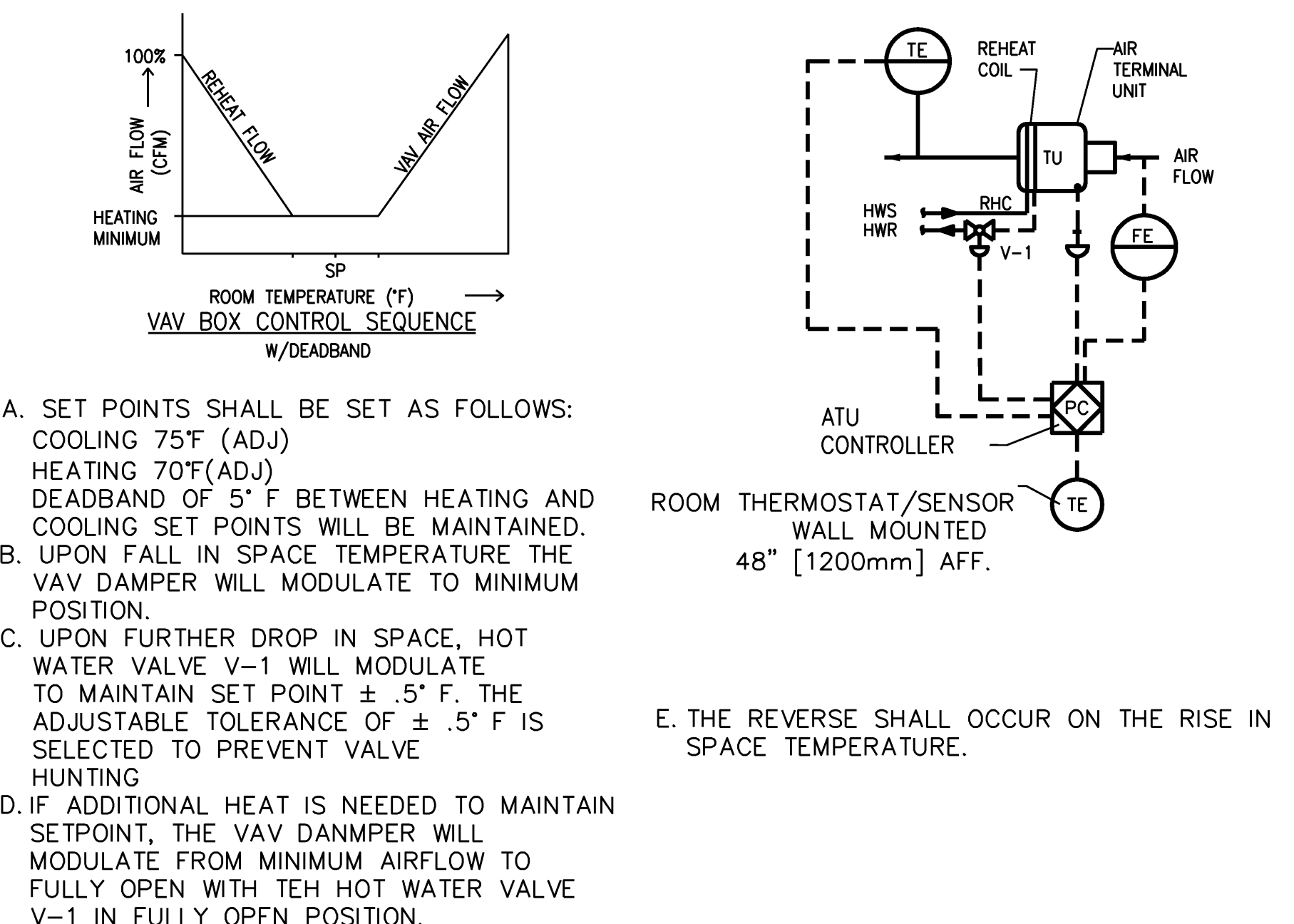
1 CV COOLING WITH REHEAT
SCALE: NONE



3 AIR HANDLING UNIT W/PRE-HEAT COIL CONTROL DIAGRAM - 11-AHU1
NOT TO SCALE

SEQUENCE OF OPERATION FOR VARIABLE AIR VOLUME AIR HANDLING UNIT

- GENERAL
 - 1.1 UNIT IS NORMALLY STARTED AND STOPPED REMOTELY AT THE ECC. H-O-A SWITCH SHALL BE KEPT IN THE "AUTO" POSITION. "HAND" AND "OFF" POSITIONS SHALL BE USED ONLY FOR MAINTENANCE. WHEN THE UNIT IS "OFF" D-1 AND D-2 SHALL BE FULLY CLOSED. WHEN THE UNIT IS "ON" D-2 SHALL BE FULLY OPEN.
 - 1.2 A DAMPER END SWITCH ON D-3 SHALL PREVENT FAN FROM STARTING UNTIL DAMPER IS FULLY OPEN.
- TEMPERATURE CONTROL
 - 2.1 SUPPLY AIR TEMPERATURE, SENSED BY T-1, SHALL BE MAINTAINED AT SETPOINT VIA DIGITAL CONTROL PANEL BY MODULATING V-1OR V-2 IN SEQUENCE TO MAINTAIN 54° SUPPLY AIR TEMPERATURE.
- AIR FLOW CONTROL
 - 3.1 THE SUPPLY AIR FLOW SHALL BE CONTROLLED BY THE DIGITAL CONTROL PANEL MODULATING THE SUPPLY FAN VARIABLE SPEED MOTOR CONTROLLER TO MAINTAIN 1.0" [25mm] OF DUCT STATIC PRESSURE (FIELD ADJUSTABLE). SENSED BY SPS-1. RESET STATIC PRESSURE BASED ON ACTUAL BUILDING LOAD BY POLLING ALL ATUS.
 - 3.2 USING HIGH PRESSURE SENSOR, SPS-2 LOCATED AT THE SUPPLY FAN DISCHARGE, PREVENT THE SUPPLY FAN FROM DEVELOPING OVER 3" [75mm] OF STATIC PRESSURE (FIELD ADJUSTABLE). IF STATIC PRESSURE AT SPS-2 DOES EXCEED 3" [75mm] THE SUPPLY AIR FAN SHALL STOP. SPS-2 SHALL BE HARDWIRED TO THE SUPPLY FAN VSMC AND UNIT SHALL BE SHUTDOWN IN HAND/AUTO OR BYPASS MODE. SPS-2 WILL REQUIRE MANUAL RESET AT THE DEVICE TO START SUPPLY FAN.
- FREEZE PROTECTION
 - 4.1 IF THE AIR TEMPERATURE AS SENSED BY T-3 FALLS BELOW 45°F [7°C], AN ALARM SIGNAL SHALL INDICATE AT THE DCP AND ECC. IF THIS TEMPERATURE FALLS BELOW 40°F [4.4°C], AS SENSED BY THE TSL THE SUPPLY FAN SHALL SHUT DOWN AND A CRITICAL ALARM SHALL INDICATE AT THE DIGITAL CONTROL PANEL AND ECC. TSL SHALL BE HARDWIRED TO THE SUPPLY FAN LTD AND UNIT SHALL BE SHUTDOWN IN HAND/AUTO OR BYPASS MODE. TSL WILL REQUIRE MANUAL RESET AT THE DEVICE TO START SUPPLY FAN.
- AUTOMATIC SHUTDOWN/RESTART
 - 5.1 WHEN SMOKE IS DETECTED BY DUCT SMOKE DETECTOR, SD-1, THE SUPPLY FAN SHALL SHUT "OFF" AND AN ALARM SIGNAL SHALL BE TRANSMITTED TO THE FIRE ALARM SYSTEM. ALL SMOKE DAMPERS IN THE SUPPLY AND RETURN DUCTS SHALL CLOSE.
 - 5.2 EXHAUST FANS SERVING AREA OF THE SUPPLY FAN SHALL CONTINUE TO RUN. SUPPLY AND RETURN FANS SHALL RESTART AND SMOKE DAMPERS SHALL OPEN WHEN FIRE ALARM CIRCUIT IS RESET.
 - 5.3 UPON ACTIVATION OF THE FIRE ALARM SYSTEM IN ANY AREA SERVED BY 11-AHU-1, OR UPON SHUTDOWN OF THE SUPPLY FAN, ALL FIRE/SMOKE DAMPERS SHALL CLOSE. SMOKE DAMPERS SHALL OPEN PRIOR TO STARTING SUPPLY FAN TO RESUM ENORMAL OPERATION.
- EMERGENCY CONSTANT SPEED OPERATION
 - 6.1 UPON FAILURE OF THE VSMC, THE SUPPLY FAN SHALL BE STARTED/STOPPED MANUALLY AT THE DIGITAL CONTROL PANEL OR THE ECC THROUGH THE BY-PASS STARTER. FANS SHALL THEN BE OPERATED AT CONSTANT SPEED.



2 VAV COOLING WITH REHEAT
SCALE: NONE

JOB: 0555.09 BUILDING: VA SAMPLE POINTS LIST		POINT LEGEND	SYSTEM OUTPUTS	SYSTEM INPUTS	SYSTEM SOFTWARE/CONTROL	PAGE:
SYSTEM:			BINARY	BINARY	ALARM PROCESSING	APPLICATION/FUNCTION
SYSTEM COMPONENT:		POINT ID	ASSIGNMENT	POINT ID	ASSIGNMENT	REMARKS
Return air Temperature	AI-1	RAT				
Return Air Flow (cfm)	AI-2	RAF				
Mixed Air Temperature	AI-3	MAT				
Pre-Heat Temperature	AI-4	PHT				
Cooling Coil Temperature	AI-5	CCT				
Discharge Air Temperature	AI-6	DAT				
Discharge Static Pressure	AI-7	DASP				
Supply Air Flow (cfm)	AI-8	SAF				
SUPPLY FAN STATUS	BI-1	SF-SYS				
MIXED AIR LOW LIMIT	BI-2	TSL-1				
STATIC PRESSURE HIGH LIMIT	BI-3	SPS-2				
SUPPLY FAN VSMC ALARM	BI-4	SF-ALA				
SUPPLY FAN VSMC	AO-1	SF-SPD				
OUTSIDE AIR DAMPER, D-1	AO-2	OAD				
RETURN AIR DAMPER, D-2	AO-3	RAD				
PRE-HEAT VALVE, V-2	AO-4	PHT-V1				
COOLING VALVE, V-1	AO-5	CLG-V1				
SUPPLY FAN START/STOP	BO-1	SF-SST				

POINTS LIST FOR VAV AIR HANDLING UNIT WITH MINIMUM OUTSIDE AIR
NOT TO SCALE

CONTROL IDENTIFICATION		
DEVICE DESIGNATION	DESCRIPTION	FUNCTION
G	PRESSURE GAUGE	FILTER CONDITION INDICATOR
SPS-1	STATIC PRESSURE SENSOR (SEE FLOOR PLANS FOR LOCATION)	SENSES AND TRANSMITS DUCT STATIC PRESSURE TO DCP.
SPS-2 SPS-3	HIGH LIMIT STATIC PRESSURE SENSOR	SENSES AND TRANSMITS DUCTSTATIC PRESSURE NEAR AHU TO DCP.
T-1	SUPPLY AIR TEMPERATURE SENSOR	SENSES AND TRANSMITS SUPPLY AIR DRY BULB TEMPERATURE TO DCP FOR CONTROL AND INDICATION.
T-2	LEAVING PRE-HEAT COIL AIR TEMPERATURE SENSOR	SENSES AND TRANSMITS PRE-HEAT COIL DRY BULB TEMPERATURE TO DCP FOR ONTROL AND INDICATION
T-3	RETURN AIR TEMPERATURE SENSOR	SENSES AND TRANSMITS RETURN AIR DRY BULB TEMPERATURE TO DCP FOR INDICATION ONLY.
T-4	MIXED AIR TEMPERATURE SENSOR	SENSES AND TRANSMITS MIXED AIR DRY BULB TEMPERATURE TO DCP FOR INDICATION ONLY.
T-5	LEAVING COOLING COIL AIR TEMPERATURE SENSOR	SENSES AND TRANSMITS COOLING COIL DRY BULB TEMPERATURE TO DCP FOR INDICATION ONLY.
V-1	CHILLED WATER CONTROL VALVE STRAIGHT THROUGH MODULATING TYPE	PROPORTIONS FLOW OF CHILLED WATER TO COOLING COIL IN RESPONSE TP DCP.
V-2	STEAM CONTROL VALVE STRAIGHT THUR MODULATING TYPE	PROPORTIONS FLOW OF STEAM TO PRE-HEAT COIL IN RESPONSE TP DCP.
VPS	VELOCITY PRESSURE SENSOR	SENSES AND TRANSMITS VELOCITY PRESSURE TO DCP.
VSMC	VARIABLE SPEED MOTOR CONTROLLER WITH MOTOR STARTER	CONTROLS SUPPLY AND RETURN FANS MOTOR SPEED IN RESPONSE TO DCP.
AFM	AIR FLOW MEASURING DEVICE	MONITORS AIR FLOW RATE PROVIDES VELOCITY PRESSURE FOR TRANSMITTAL TO DCP.
DP	DIFFERENTIAL PRESSURE SENSOR	TRANSMITS DIFFERENTIAL PRESSURE TO DCP TO INDICATE FILTER CONDITIONS AND STATUS OF FANS.
DCP	DISTRIBUTED CONTROL PANEL	CONTROLS OPERATION OF AIR HANDLING UNIT IN ACCORDANCE WITH THE SEQUENCE OF OPERATION
D-1	OUTSIDE AIR DAMPER 2 - POSITION	OPENS WHEN SUPPLY FAN STARTS AND CLOSSES WHEN SUPPLY FAN STOPS.
D-2	RETURN AIR DAMPER MODULATING	PROPORTIONS FLOW OF RETURN AIR IN RESPONSE TO DCP.
FS	DUCT SMOKE DETECTORS (FURNISHED AND WIRED TO FIRE ALARM PANEL BY ELECTRICAL)	PROVIDE SMOKE SIGNAL TO DCP.
TSL	LOW LIMIT TEMPERATURE SENSOR, EXTENDED ELEMENT, SERPENTINE WRAP TO FULLY SENSE TEMPERATURE	LOCATE AT ENTERING FACE OF COOLING COIL. MANUAL RESET TYPE.
SD-1 SD-2	DUCT MOUNTED SUPPLY AND RETURN AIR SMOKE DETECTOR	INTERLOCK WITH FIRE ALARM SYSTEM TO SHUT DOWN FAN UPON ACTIVATION

SCHEMATIC DESIGN SUBMISSION	08/02/10
DESIGN DEVELOPMENT SUBMISSION	09/03/10
CONSTRUCTION DOCUMENT SUBMISSION	11/22/10
ISSUE FOR BIDS	12/19/11
Revisions	Date

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FIRE PROTECTION ENGINEERS
CIVIL ENGINEERS

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PROTECTION DEVELOPMENT INC.
BREWER AND ESCALANTE

12/16/11
Burns, DeLattie & McCoy, Inc.
Texas Registered Engineering Firm
F-685

"ISSUED FOR BIDS"- FULLY SPRINKLERED

Drawing Title: **AIR FLOW DIAGRAM, TEMPERATURE CONTROL DIAGRAM AND SEQUENCE OF OPERATION**

Project Title: **BUILDING 11 ADDITION AND INTERIOR RENOVATIONS**

Project Number: **674A4-CSI-516**

Building Number: **11**

Location: **WACO, TEXAS**

Date: **19 DEC 2011**

Checked: **FP**

Drawn: **JKL**

Dwg. of: **MH002**

Office of Construction and Facilities Management

Department of Veterans Affairs